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AIR POLLUTION AND ENERGY EFFICIENCY

Development of the first version of industry guidelines on calculation and verification of the Energy Efficiency Design Index (EEDI)

Submitted by BIMCO, CESA, IACS, ICS, INTERCARGO, INTERTANKO, ITTC, OCIMF and WSC

SUMMARY

Executive summary:	This document discusses the development of the first version of industry guidelines concerning the uniform implementation of the EEDI requirements and the role of the verifier in conducting the verification of EEDI
Strategic direction:	7.3
High-level action:	7.3.2
Planned output:	7.3.2.1
Action to be taken:	Paragraph 23
Related documents:	MEPC 62/5/21, MEPC 62/24; MEPC 63/INF.8, MEPC 63/23; resolutions MEPC.212(63), MEPC.214(63) and MEPC 64/INF.22

Introduction

1 Document MEPC 62/5/21 informed the Committee of the work of a Joint Industry Working Group (JWG) on the EEDI, formed by the following international shipping associations and organizations: IACS, BIMCO, CANSI, CESA, CESS, ICS, INTERCARGO, INTERTANKO, KOSHIPA, OCIMF and SAJ. ITTC and WSC joined the JWG in 2011.

2 The work of the JWG is to prepare industry guidelines providing agreed procedures for the computation and verification of the EEDI, compliant with the relevant IMO guidelines in resolutions MEPC.212(63) and MEPC.214(63), to be used by the verifiers as well as the submitters when verifying and computing EEDI respectively.

3 In the *2012 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)* (resolution MEPC.214(63)), note 2 under paragraph 4.2.6 of the guidelines states: "A joint industry standard to support the method and role of the verifier will be developed." In order to meet this objective, the industry guidelines include a procedure for the review and the witnessing of the tank tests by the verifier.

4 The first version of industry guidelines is dedicated to the most common cases and consequently:

.1 the scope of application is limited to cargo ships listed in table 1 of regulation 21, thus excluding, at first, passenger ships;

.2 diesel-electric, turbine or hybrid propulsion systems are excluded;

.3 innovative devices like wind assisted propulsion, air lubrication or other innovative energy-saving devices are excluded; and

.4 verification of EEDI subject to a major conversion is not addressed.

5 A subsequent version of the industry guidelines will cover all ship and propulsion types, as well as innovative energy-saving devices that are within the scope of the MARPOL Annex VI amendments on energy efficiency.

6 During the development of the industry guidelines, the JWG members agreed interpretations relevant to the following elements of the *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships* (resolution MEPC.212(63)) and the *2012 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)* (resolution MEPC.214(63)):

.1 the implicit replacement of the capacity correction factor f_i by the product $\prod_{i=1}^{m} f_i$;

.2 the method of including shaft generators and shaft motors into the EEDI calculation;

.3 the degree of uncertainty in the determination of the value of the attained EEDI (at about 1%) and its consequences on the reporting format;

.4 a procedure for assessing the speed V_{ref} from model tests at the design stage, including review of the model-ship correlation factors and witnessing model tests by verifier; and

.5 an alternative procedure to adjust speed when sea trials cannot be conducted at ship's summer load draught which is in line with the current practice of the tank test organizations.

7 The first version of industry guidelines intended to be used by the relevant parties when implementing the EEDI scheme on or after 1 January 2013, is set out in the annex to document MEPC 64/INF.22.

8 The following paragraphs provide supplemental information on the five topics listed in paragraph 6 above.

Capacity correction factor f_i

9 The *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships,* adopted at MEPC 63, introduced two new capacity factors f_i: f_{iVSE} for voluntary structural enhancements and f_{iCSR} for bulk carriers and oil tankers built in accordance with Common Structural Rules. One ship may cumulate these factors (i.e. an ice-classed CSR bulk carrier with voluntary structural enhancement) and the f_i

coefficient in the defining formula of the EEDI (paragraph 2 of the *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*) is to be understood as $\prod_{i=1}^{m} f_i$ like the f_j correction factor.

10 However, it is important to note that the calculation of the f_{iVSE} correction factor needs the deadweight of the ship before enhancements ($DWT_{referencedesign}$). This reference design should fully comply with the ice notation or CSR requirements in order for the f_{iVSE} factor to combine with the other f_i(s).

11 This issue is referred to in section 9 of the industry guidelines (MEPC 64/INF.22).

Shaft generators and shaft motors

12 When adopting, at MEPC 63, the *2012 Guidelines on the method of calculation of the attained Energy Efficiency Design Index (EEDI) for new ships*, the Committee introduced the possibility to take into account the limitations of the propulsive power by verified technical means. This allows ships fitted with some means of auxiliary propulsion for safety (e.g. Power Take-Home system) not to be unduly penalized.

13 Explanations and examples of typical arrangements are given in section 6 of the industry guidelines (MEPC 64/INF.22).

Uncertainty on the determination of attained EEDI

14 Due, in particular, to the uncertainties on the quantities measured during the sea trials (displacement, power and speed of the vessel), as well as the inherent limits of any speed adjustment method, the accuracy of the calculation of the attained EEDI cannot be better than 1 per cent.

15 Limits in accuracy shall be taken into account in the presentation of the results and verification of the compliance with the criteria in regulation 20, chapter 4 of MARPOL Annex VI.

16 This point is referred to in section 3 of the industry guidelines (MEPC 64/INF.22).

Procedure to assess V_{ref} at the design stage

17 As mentioned in the *2012 Guidelines on survey and certification of the Energy Efficiency Design Index(EEDI)*, standardized methodologies to deal with model-ship correlation (the comparison between the tank test results and the expected sea trial results) and speed adjustment may benefit the EEDI determination process.

18 The JWG worked with ITTC members to agree on the way for the verifier to verify the acceptability of model-ship correlation and witness the tank tests during the preliminary verification at the design stage.

19 This point is referred to in section 15 of the industry guidelines (MEPC 64/INF.22).

Procedure to adjust speed as a result of sea trial

20 An adjustment procedure is needed for ships for which sea trials cannot be conducted under the EEDI condition. As indicated explicitly in the *2012 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI)*, figure 2 of the Guidelines only provides an example of a possible method of ship speed adjustment.

21 Members of the JWG agreed that the usual procedure of the ITTC members, which is based on power adjustment instead of speed adjustment, is somewhat more precise due to the exponent of the propeller law (three or more).

22 This point is referred to in sub-section 16.2 of the industry guidelines (MEPC 64/INF.22).

Action requested of the Committee

23 The Committee is invited to consider the information provided above, as well as note the first version of industry guidelines in the related document MEPC 64/INF.22, and take action, as appropriate.